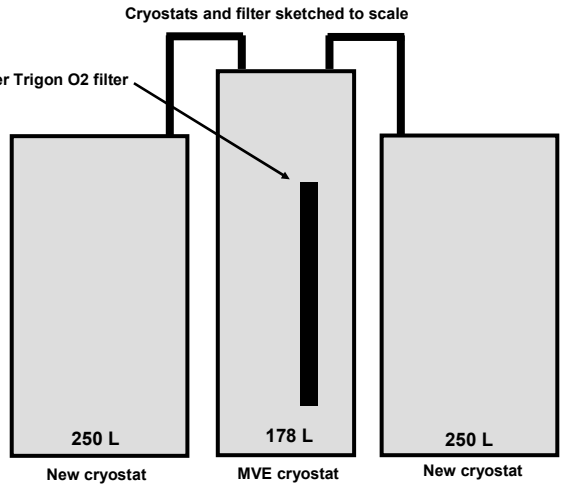
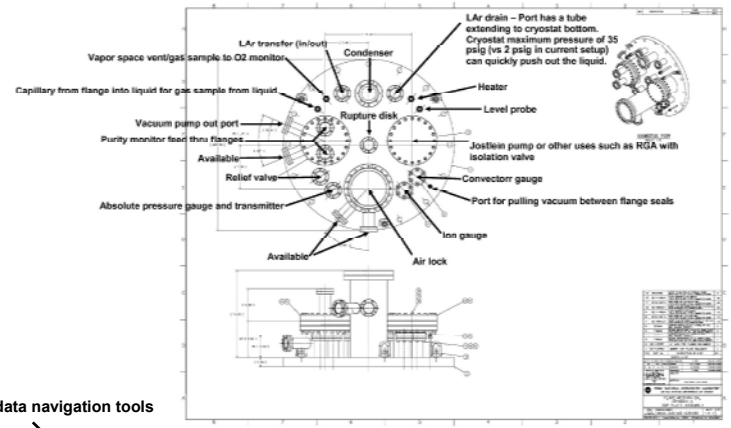
Terry Tope
2/9/06
Version 1

- Studies to perform with this system
  - Filter
    - Test different filter materials for O2, H2O, maybe other contaminants such as N2
    - Test filter combinations such as H2O before O2
    - Determine filter capacities
    - Determine flow rate effect
  - Material lock
    - Introduce materials into gas phase
    - Introduce materials into liquid phase
    - RGA studies in parallel
    - Introduce gas contaminants such as water vapor and N2
  - Metal seals
    - Gain experience with large diameter metal seals
    - Two different types of metals seals were procured
  - Purge from atmosphere
    - Install manifold at cryostat bottom/top scaled to Schmitt's big tank analysis
    - Measure O2 level at cryostat exhaust as a function of time
    - Introduce liquid after purge and purify
  - TPC chamber
    - Effects of boiling/vibration on wires
    - Material contamination due to chamber
  - Other investigations?

- New cryostat with 35 psig maximum allowable pressure
  - Features
    - LAr condenser to keep system closed
    - Flange with double o-ring grooves for purity
      - o-rings can be purged with Ar
      - o-rings can have a vacuum pulled between them
      - we also have metal seals
    - Port for gas contamination introduction
    - Isolation valve for separation from other cryostats
    - Flange for material lock
    - Flange for Han's pump
      - Pump needs integral filter that can be regenerated in place
      - With material lock and gas contamination introduction it would be possible to spoil the filter
    - LAr drain port
    - LAr transfer port
    - Heater to create pressure to move liquid to other cryostat or out drain
    - Relief valve & rupture disk
    - Solenoid vent valve to prevent relief valve from opening
    - Purity monitor feed thru flange
    - Vacuum pump out port
  - Instrumentation
    - Vacuum – convectorr and ion gauge
    - Pressure – 0-50 psia transmitter and 0-60 psia gauge
    - Capacitance level and differential pressure level
    - Purity monitor(s)
    - Liquid and gas sample ports for O2 analyzer and RGA
  - Other required features?

Cryostats and filter sketched to scale

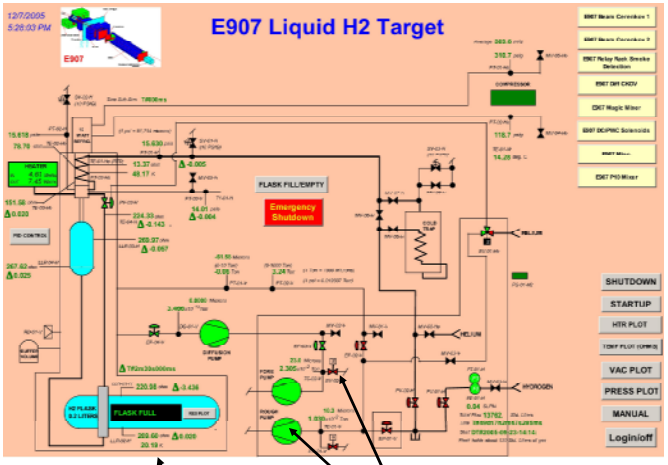




- MVE cryostat used as vacuum can for filter(s)
  - Reasons to use
    - More room for filters and valving than "p-bar" dewar
    - Non-code Cryostat cannot be used as a pressure vessel on a closed system so this is a good use for it
  - Features
    - Filter valves for
      - bypass
      - regeneration
      - isolation
      - one-way filtering
      - Remote actuation should be achievable
  - Temperature instrumentation and heaters for filter regeneration in place
  - Insulating vacuum instrumentation

- Controls
  - Beckhoff PLC
    - Control pressures, temperatures, open/close valves, provide interlock protections
    - Operations independent of Windows PC
    - Easily expandable
  - iFix GUI
    - Talks to Beckhoff PLC and displays real time pressures, temperatures, levels, valve positions on Windows PC
    - Allows for valve actuation, set point changes, etc
    - License was purchased for web display
    - Records values for historical display
    - Trouble shooting much easier with historical records
    - Alarms can be set up to make local noise and send emails when action needs to be taken

iFix picture



iFix historical data navigation tools